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# Minnegram Fall 2013

## Director's Corner

- [Fall 2013 Director's Corner](#)

## Features

- [October Water Resources Conference offers wide spectrum of water management solutions, perspectives](#)

The Water Resources Center will host the annual Minnesota Water Resources Conference at the St. Paul River Centre, October 15 and 16, 2013. Conference attendees can expect to be presented a variety of new water resource solutions, management techniques, and current research about Minnesota’s water resources. Concurrent sessions throughout the day will offer information on engineering projects, best practices in design and application of water resource management methods, water policy and emerging issues. A morning plenary session begins each day of the conference, and luncheon will also feature a speaker. Topics this year will touch on water sustainability for future generations, how conservation practices could affect Gulf hypoxia, and the relationship of politics and science in the United States.

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Among the scientists, policy makers, and natural resource experts speaking at November's Preparing Minnesota for Climate Change: A Conference on Climate Adaptation, there's a paper-pushing, tie-wearing insurance guy who's become one of Minnesota's most sought after experts on the costs of climate change.

Over the past few years, Johnson has increasingly been called upon by policy makers and politicians including Senator John Marty and former Senator Ellen Anderson to testify on Minnesota's alarming insurance rate hikes due to natural disasters.

- [Webinars provide UM expertise to Minnesota SWCD's assisting landowner conservation efforts](#)

When Water Resources Center (WRC) co-director Faye Sleeper and LeAnn Buck of the Minnesota Association of Soil and Water Conservation Districts (MASWCD) meet regularly for lunch, the conversation often focuses on the importance and challenge of getting UM research into the minds and hands of SWCD officials and staff across Minnesota. "We realized we needed a pathway to get the latest WRC and UM Extension scientific research into application, addressing land and water issues," said Sleeper. The resulting partnership between UM Extension, WRC and MASWCD will produce three webinars per year. Earlier this year webinar offerings were: Emerging Climate Trends with Mark Seeley, and Emerging Conservation Practices, and Challenges for Agricultural Drainage with Gary Sands. The third presentation with Lee Frelich will air October 2, at 10:00am. Topics for the 2014 webinars are still under consideration.

- [Minnesota Water Sustainability Framework: A three year progress report](#)

Five years ago this November, Minnesota voters approved an amendment to the state Constitution to raise the sales tax 3/8ths of one percent and dedicate these resources to four funds: 33% for the Clean Water Fund, 33% for the Lessard-Sams Outdoor Heritage Fund, 12.25% to the Parks & Trails Funds, and 19.75 % for the arts and cultural heritage fund. This amendment, known as the Clean Water, Land and Legacy Amendment, has raised approximately \$85 M per year for the Clean Water Fund. This fund is then appropriated by the Legislature to supplement programs that address the protection and restoration of the state's surface and groundwater resources.

One of the first appropriations that the Legislature made was directed to the University of Minnesota's Water Resources Center (WRC) to prepare a long term plan for sustainable management of the state's water resources and inform the long term strategy of investment by the Legislature to produce the best outcomes. The Minnesota Water Sustainability Framework was presented to the Legislature in January 2011, and contained a comprehensive, system-based set of recommendations and solutions for the ten biggest issue areas that cut across the environmental, social, and economic domains of sustainability.

The Framework is now approaching its third birthday, and as the state's citizens evaluate the five-year progress of

the Amendment investments, the WRC is assessing the extent to which the recommendations have been considered, adopted, or implemented. This assessment is summarized below. The issues are directly from the Framework.

- [Farm serving as laboratory](#)

"We don't want just random acts of conservation," he said. "We want a cumulative effect. ... We need to recognize we aren't necessarily going to get full treatment at each location, but there is a cumulative effect."

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## Fall 2013 Director's Corner

I was taking items from my house out to the street for my block's annual National Night Out event, and was surprised to see someone setting up an information table on storm water runoff. My neighbors asked if I was responsible, and when I said "no" they seemed as surprised as I was. My brain finally registered that this was several members of the first cohort of Master Water Stewards, a program developed by the Freshwater Society, starting in the Minnehaha Creek Watershed District. I had led a session on water policy a few weeks before for this class of dedicated volunteers and had no idea that my block would be one of the first to reap the benefits of the program. I paused, and then smiled. For those of us who are been in the water resources field for some time, this signals yet another step in broadening the legion of specialists working to protect and restore our precious water resources. Research shows that neighbor-to-neighbor interaction is an effective educational approach.



As researchers and educators at the Water Resources Center, we recognize the importance of multiple means of disseminating current research to water specialists and citizens. One of the premier events sponsored in part by the WRC is the annual Water Resources Conference, which is highlighted in this issue of the Minnegram. After you read the article, don't forget to go to [wrc.umn.edu](http://wrc.umn.edu) to register for this year's conference. It is a great time to learn about the latest research, new methods of engaging individuals and communities, and new policy issues. This fall, we are also expanding the WRC's portfolio of professional training programs, with a new online Watershed Specialist course. We are full for the fall course, but look for another class beginning in January 2014. You will also read about a new webinar series designed specifically for

water professionals in Local Units of Government across the state, which highlights the latest University of Minnesota research that is relevant to those positions. These are just a few of the current ways we ensure that the latest research and information is accessible to citizens and water specialists.



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**Shawn Lawrence Otto** is an award-winning science advocate, author, filmmaker, speaker, novelist, artist and humanitarian who also works for smarter politics on a global scale. He is the cofounder and producer of the US presidential science debates, between President Barack Obama and his opponents Senator John McCain and Governor Mitt Romney, which have become the largest political initiatives in the history of science. The presidential science debates have since been emulated in several other nations. In 2012, US congressional leadership also participated and Otto organized and co-moderated a live-streamed presidential surrogate science debate on Capitol Hill. His book FOOL ME TWICE: Fighting the Assault on Science in America, won the 2012 Minnesota Book Award.

His message is that science is quickly outstripping our global policymaking apparatus and the gap is posing a serious challenge to democracy. Shawn has served in an advisory capacity for the National Academy of Sciences, and the Union of Concerned Scientists' new Center for Science and Democracy.

**Cathy Kling**, Charles F. Curtiss Distinguished Professor of Agriculture and Life Sciences and a

https://www.wrc.umn.edu/publications/minnegramp/fall-2013/october-wrc-perspectives[2/1/2018 1:23:22 PM]



professor of economics, has served as the director of CARD since July 2013, after having served many years as the division head of CARD's Resource and Environmental Policy Division. She received a bachelor's degree in business and economics from the University of Iowa and a doctorate in economics from the University of Maryland. In her work at CARD, Kling is undertaking research to examine how agricultural practices affect water quality, wildlife, soil carbon content, and greenhouse gases.



**Jim Stark** is Director of the U. S Geological Survey's Water Science Center in Minnesota. As Director he manages the Center's programs and works cooperatively with federal, state and local governmental partners. Jim began his USGS career in Michigan and also worked in Utah before coming to Minnesota. Prior to becoming Director Jim served as the Center's Groundwater Specialist as well as directing National Water Quality Assessment and Studies Programs in Minnesota. He has been the author of more than 60 scientific reports and journal articles that focus on groundwater and groundwater/surface water interactions. Jim is a licensed Professional Geologist in

Minnesota. He holds a BS degree in geology from UMD, MS degrees in geology and in water resources from the University of Wisconsin, and an MBA from the University of St Thomas.

**Rebecca Flood** joined the Minnesota Pollution Control Agency in October 2008 as the Assistant Commissioner for water policy matters. In this role, she oversees the agency's programs and activities to maintain and improve the quality of Minnesota's lakes, rivers, streams and wetlands.



Rebecca chairs the Clean Water Fund Interagency Coordination Team, which is comprised of the seven state agencies that receive legislative appropriations from the constitutionally dedicated sales tax receipts resulting from the 2008 Clean Water, Land and Legacy Amendment to the State Constitution. The appropriations from this fund supplement the protection and restoration of Minnesota's water resources. The Team ensures that Clean Water Funded agencies utilize the funds in a coordinated, efficient and effective manner.

Rebecca also serves as the State representative on US EPA's Gulf of Mexico Hypoxia Task Force and is leading the State's development of its Nutrient Reduction Strategies. She represents the MPCA on a variety of other water-related boards and advisory groups, including the University of Minnesota's Aquatic Invasive Species Research Center Advisory Board, the Minnesota Board of Water and Soil Resources, the Minnesota Public Facilities Authority and the Agricultural and Economic Development Board. In addition to being the liaison to the agricultural sector, she serves as the agency's technical representative to the Minnesota Agricultural Water Quality Certification Program Advisory Committee. This committee is advising the Commissioner of Agriculture on the development of a voluntary program designed to expedite adoption of agricultural best management practices specifically designed to protect water quality.

Prior to joining the MPCA, Rebecca was employed by the Metropolitan Council for 30 years in a variety of clean water



programs, most recently serving as the Environmental Compliance Manager for the Council's municipal wastewater treatment facilities in the seven-county St. Paul/Minneapolis metropolitan area. In this role, she also represented the Council on a wide variety of statewide water policy committees, and led the development of both the Council's phosphorus and mercury reduction strategies.

Rebecca holds a Bachelor of Science degree in Wildlife Biology from Michigan State University.

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A portrait of Bob Johnson, a middle-aged man with glasses, wearing a dark suit, white shirt, and patterned tie. He is smiling slightly.

## Numbers Don't Lie: Insurance guy Bob Johnson has become a go-to source on the statistical effects of climate change

Among the scientists, policy makers, and natural resource experts speaking at November's Preparing Minnesota for Climate Change: A Conference on Climate Adaptation, there's a paper-pushing, tie-wearing insurance guy who's become one of Minnesota's most sought after experts on the costs of climate change.

Bob Johnson is the president of the Insurance Federation of Minnesota (IFM), a nonprofit state insurance trade association representing more than 50 insurance companies and other related organizations. Originally founded in 1914 to help insurers and policy holders navigate Minnesota's worker's compensation laws, the IFM spends much of its time these days representing insurance companies in the risky world of catastrophic insurance—the kind of insurance that protects homeowners against natural disasters such as floods, tornados, fires, hurricanes, and earthquakes.

Over the past few years, Johnson has increasingly been called upon by policy makers and politicians including Senator John Marty and former Senator Ellen Anderson to testify on Minnesota's alarming insurance rate hikes due to natural disasters.

Last spring, Johnson served on the climate panel of the Minnesota Environmental Quality Board's first Minnesota Environmental Congress. Along with University of Minnesota Extension professor, state climatologist Mark Seeley, and Center for Earth, Energy and Democracy executive director Shalini Gupta spoke to the increasing costs to property and infrastructure and the damage to natural environment due to Minnesota's warming climate.

While hurricanes may get all the headlines, Minnesota's thunderstorms—storms that produce flash floods and golf-ball sized hail—are responsible for making land-locked Minnesota the 14th most expensive state for homeowners insurance.

https://www.wrc.umn.edu/publications/minnegram/fall-2013/bob-johnson-stats[2/1/2018 1:23:49 PM]

"I'm an insurance guy," says Johnson. "I'm not bringing climate change expertise to the table. I can only I speak to what's happening in the insurance world—and things are happening very, very differently than in the past." The significant factor in Minnesota's increasing insurance rates is hail damage produced by severe thunderstorms. Ten percent of all Minnesota thunderstorms are now classified as "severe," which means they produce winds of 58 mph or greater and contain ¾ inch size hail.

In 2007 and 2008, Minnesota was one of the top three of all 50 states in the national of the catastrophic or "CAT" losses according to Johnson. "We were ranked higher than any of the hurricane states in damages due to natural disaster losses, primarily from hail," he says. "Talk to anyone who owns a house—the consumer translation to increasing weather-related damage is showing up in higher property insurance rates."

Johnson says the dramatic uptick in storm-related property claims is not population related. Nor is it due to changes in building codes: "We're not consistent throughout the state, but over time we've strengthened building codes, so we know it's not a construction issue," he says. "If you get golf ball-sized hail, your roof is gone."

"People can be critical of insurance and it isn't always perfect," Johnson says. "But numbers don't lie—Minnesota insurance claims have resulted in premium increases of 267 percent from 1997 to 2010. The national increase over the same period is 199 percent."


As a guy whose specialty is historical number crunching, Johnson is reluctant to predict the future. "Insurance companies don't price a product based on what they think will happen in the future," says Johnson. "We're not permitted to guess about the future and we can't act on speculation." Predictions, he says, are best left to experts like Mark Seeley (see Summer 2013 Minnogram on Mark Seeley and Minnesota's super storms).


In the meantime, consumers can reduce their premiums by changing their deductibles. Johnson also thinks that homeowners insurance might someday be more aligned with auto insurance with claims paid on a depreciated basis. "The insurance industry has traditionally sold homeowners policies as replacement coverage," he says. "That might be something that changes in the future."

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Webinars provide UM expertise to Minnesota SWCD's assisting landowner conservation efforts

When Water Resources Center (WRC) co-director Faye Sleeper and LeAnn Buck of the Minnesota Association of Soil and Water Conservation Districts (MASWCD) meet regularly for lunch, the conversation often focuses on the importance and challenge of getting UM research into the minds and hands of SWCD officials and staff across Minnesota. “We realized we needed a pathway to get the latest WRC and UM Extension scientific research into application, addressing land and water issues,” said Sleeper. The resulting partnership between UM Extension, WRC and MASWCD will produce three webinars per year. Earlier this year webinar offerings were: Emerging Climate Trends with Mark Seeley, and Emerging Conservation Practices, and Challenges for Agricultural Drainage with Gary Sands. The third presentation with Lee Frelich will air October 2, at 10:00am. Topics for the 2014 webinars are still under consideration.

The webinars translate UM research into a format accessible to SWCD staffers and supervisors, who in turn can provide knowledgeable, science-based answers to questions they receive from landowners. The topics chosen for the webinars are hot button issues of the day, including climate change, our changing forests, and agricultural drainage, all of which are examined under the scope of the latest research. And, they offer some practical solutions.

Gary Sands addressed the practice of conservation agricultural drainage, asserting that drainage will always be essential to feeding more and more people. While drainage is unavoidable, he advocates practicing the golden rule of drainage, “drain what is necessary for healthy soil and crop growth and not a drop more.” He cited an upcoming fall 2013 Extension publication which features ten ways to reduce nitrogen loads in agricultural runoff, including use of winter cover crops, reducing nitrate concentrations in the root zone, recycling of drainage water, which reduces the amount of nitrate delivered to the field edge, and saturated buffers which remove nitrates at the field’s edge before the water reaches the ditch or stream.

The first two webinars averaged 40 location views, a figure that makes LeAnn Buck happy. “SWCDs work on a one-to-one

basis with citizens to implement conservation practices across the landscape. The webinars provide a window into emerging research and science promoting more effective application of conservation activities by resource professionals, while helping the SWCD citizen board members prioritize local resource efforts.”

Gary Sand's August 2, 2013 webinar is available for viewing here: <https://umconnect.umn.edu/p12677928/>

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hydrologic mapping necessary to inform models of our water balance have been accelerated by legislative investments, although they are still will not be completed for another 15-20 years. The legislature has invested more funds in expanding DNR's observation well network that will eventually supply the necessary data to be used in these models (they currently have 700 of the 8000 that are estimated to be needed). Finally, the recommended updates and improvements to the DNR water appropriations permits were embraced and are currently being implemented. In particular, the DNR is developing "sustainability standards" for withdrawals that are linked to minimal surface flows to protect ecosystem function.

## **Issue B: Excess Nutrients and Conventional Pollutants**

This issue largely relates to existing and future impaired waters and attaining successful pollutant load reductions of conventional pollutants to restore those waters and meet federal standards. The Framework advocates for the development of state-wide integrated nutrient management plans, and one positive example of such an effort is the Nitrogen Reduction Strategy just released by the MPCA.

The two boldest recommendations from the Framework are aimed at addressing unregulated, non-point source pollution – to have equity in achieving load reductions by including all pollutant sources in the solution, and to require load reductions from all sources be mandatory. These recommendations are largely aimed at including (requiring) the un-regulated agricultural community in reducing nutrient, sediment, and bacterial loadings. The specific approaches for how to achieve these recommendations have not been carried forward. However, there has been more and more discussion of sources and equity in responsibility of reducing them. One recommendation from this section of the Framework was to establish a water quality certification program for farmers. The USDA and US EPA chose Minnesota to pilot such a program, and the voluntary Minnesota Agriculture Water Quality Certification Program will begin accepting applications later this year or early 2014.

## **Issue C: Contaminants of Emerging Concern**

While the state continues to invest in research on CECs and fund the MDH program that is developing drinking water standards for CECs, there have been no substantial policy changes.

## **Issue D: Land, Air, and Water Connection**

How land is developed and used has many direct effects on the quality of water that falls and runs off the surface. The Framework recommendation to require integrated land and water planning has been encouraged by the state legislature, but only as a voluntary measure.

## **Issue E: Ecological and Hydrological Integrity**

This issue encompasses the hydrological cycle and habitat protection, and their interconnections. Progress has been made in aquatic invasive species management, in habitat protection through land purchases or easements, and in increasing awareness of the need to consider conservation drainage practices for managing tile drainage. For example, the Legislature has funded an Aquatic Invasive Species Research Center at the University of Minnesota, and the DNR has increased its efforts at preventing the spread of existing invasives such as zebra mussels.



## **Issue F: Water – Energy Nexus**

There has been increased dialogue and awareness of how water and energy are intertwined. The Metropolitan Council is considering a study to quantify the relationships for the Metro region, which is consistent with Framework recommendations.

## **Issue G: Water Pricing and Valuation**

This area is one place where the action of the state is opposite to what was recommended. At the time the Framework passed, the Legislature had required the Metro to institute conservation pricing for municipal systems, and required the rest of the state to adopt it in a matter of years. Since then, however, the Legislature repealed the latter part.

## **Issue H: Public Water Infrastructure Needs**

The State Revolving Funds for assisting municipalities with infrastructure cannot keep up with demand, and the gap grows larger with time. There has been no progress on designing a process for addressing this gap.

## **Issue I: Citizen Engagement and Education**

No formal policy changes have occurred to improve water education and public engagement. However, the WRC recently held an all-day workshop for Minnesota legislators on water issues and policies in an effort to increase the understanding of our decision-makers.

## **Issue J: Governance and Institutions**

The McKnight Foundation funded the WRC to complete a scoping study for what process might best be used to conduct a comprehensive review of the state's water policy. Both the Legislature and the Governor and Executive Branch would need to be engaged to make this a successful enterprise.

Overall, the Framework continues to be a living document and touchstone for guiding policy and discussion on sustainable water management for the state. Even after only three years, many of the recommendations have been adopted or discussed, and the awareness of the ten “Big Issues” is high.

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## Addthis

"There are water quality issues out there," he said. "The kinds of things we have been doing in the past haven't gotten us to where we want to be. ... We need to start thinking outside the box."

Roberts had to point out on his land where the conservation practices actually were located, and that is part of the plan.

"Our objective is to not take cropland out of production," Magner said.

Under two feet of dirt, below the field of corn and the road, is a woodchip bioreactor. Roberts has two of them under his farm.

The bioreactors are filled with wood chips, which slow down and filter water coming off the fields. Magner said it sequesters nitrogen and holds back sediment before emptying into the creek.

Magner said Roberts' fields use wood chips, but in areas with fallen wood, the same effect can be created. He is working in the surrounding area to create a more open system in a wooded area.

Magner recognized that there are some downsides to the systems, including the possible creation of methylmercury if poorly managed. Methylmercury is a type of mercury that can poison humans and animals.

Another conservation practice shown Thursday is a constructed wetland.

Chris Lenhart, also with the University of Minnesota, said constructing wetlands is a good way to get back the benefit of a natural resource that has been drained away in most of southern Minnesota.

Studies have shown that wetlands remove 80 percent of nitrates over time, with numbers close to 100 percent during certain times of the year. They are less effective at removing phosphorus.

He said the wetland on Roberts' property had a rough year, being installed while the ground was still frozen, and flooded in June before the plantings were established, but they have seen some of the benefits they were hoping for, including decrease of water volume as the water slows and evaporates.

"This is the first one of its type in the area," Lenhart said. "There haven't been any specifically designed for nitrate removal."

The size of the wetland depends on the size of the fields it is draining, Lenhart said, as they are connected to tiling outlets. Typically, the size is 1 percent of wetland to ag area.

Another conservation practice being studied in surrounding areas and discussed Thursday are two-stage ditches.

The ditches are a relatively simple change to existing ditches, according to Magner.

Installed in the ditch is a small floodplain area, called a bench, that gives the water room to spread out and slow down.

The ditches do take a little more space than most existing ditches, but reports in the study areas indicate farmers consider the reduction in flooding worth the small acreage lost.

It is in the combining of water-quality methods that Magner hopes to find the solution to Elm Creek's water-quality problem.

"We don't want just random acts of conservation," he said. "We want a cumulative effect. ... We need to recognize we aren't necessarily going to get full treatment at each location, but there is a cumulative effect."

Reggie Liddel, with NRCS, said many conservation programs have funding sources available, and farmers interested in water-quality projects should talk to their local offices about it.

"All these come down to managing the water coming back into the landscape," Magner said.



Chris Lenhart of the University of Minnesota describes the land behind him to an audience at Darwin Roberts' farm north of Granada on Thursday. The meadow is actually a constructed wetland research area for water-quality programs.

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## Fall 2013 Community News

**William Arnold** (WRS faculty, CE) will spend the 2013-2014 academic year on sabbatical at the Woods Hole Oceanographic Institution, working with Liz Kujawinski to investigate the chemical composition of dissolved organic matter.

**Larry Baker** (WRS faculty, BBE) presented "Envisioning resilient futures for urban water and wastes," at the Past, Present, and Future Design of Infrastructures for a Resilient Society symposium, organized by T. Carter and E. Ellis for the 2013 Conference of the Ecological Society of America, St. Paul, MN, August, 2013. Baker also presented "Rethinking nutrient management in cities," at the International Low Impact Development (LID) Symposium, St. Paul, MN, August 8-13, 2013.

The American Society of Agronomy selected the newly revised UM Extension Manure Management and Air Quality website for an Award of Excellence and will be featured at the annual meetings of ASA-CSSA-SSSA. The website revision was led by Jose Hernandez (UM Extension) and financed as part of a McKnight Foundation grant funded project on grid soil sampling to guide manure application led by **Les Everett** (WRC, Education Coordinator). Case studies from the grid soil sampling project are featured on the website [www.manure.umn.edu](http://www.manure.umn.edu).

**John Gulliver** (WRS faculty, CE) was awarded two 319 grants from the U.S. EPA via the state of Minnesota: "Performance of an Agricultural Drain Tile filter" and "Internal phosphorus Load Reduction with Iron Filings."

**Sergei Katsev** (LLO, UMD) and Anders Noren (LacCore) traveled to Rwanda in March 2013 and recovered a set of sediment cores from Lake Kivu, to perform geochemical analyses and reconstruct the history of possible limnic eruptions in the lake. The funding was provided by a MacArthur Foundation grant to R.E. Hecky.

**Ann Lewandowski** (WRC, Research Fellow) gave a presentation titled "Using LiDAR Data to Advance Local Conservation Work" at the annual conference of the Soil and Water Conservation Society in Reno, Nevada on July 23, 2013. Lewandowski reviewed methods of acquisition for digital elevation data via LiDAR laser technology, the statewide LiDAR acquisition project

in Minnesota, and the recently completed training program on use of digital elevation data for conservation work. Ann's coauthors were **Les Everett** and Tim Loesch (DNR).

The Water Resources Center (WRC) assisted in the adaptation of Minnesota's Road Salt Manual and other training materials for use by Michigan Department of Transportation plow drivers. WRC co-director **Faye Sleeper** partnered with Fortin Consulting, Michigan State Extension, and University of Wisconsin Extension, transferring the basics of the Minnesota Winter Maintenance Program to Michigan. The program introduces environmental protection into winter road maintenance. Sleeper and Fortin Consulting worked with an advisory committee established by Michigan State Extension to develop a syllabus, Winter Maintenance manual and other training materials, certification and a website based on Minnesota's experience, adapted for Michigan. Michigan Department of Transportation, Michigan State Extension and others hope to develop a long term program containing some of the same elements as Minnesota's program.

**Deb Swackhamer** (WRC co-director) has been named to the National Academy of Science/National Research Council Committee on Strengthening the U.S. Environmental Protection Agency Laboratory Enterprise, which begins work in September.

The Water Resources Center is a unit of the [College of Food, Agricultural and Natural Resource Sciences](#) and [University of Minnesota Extension](#).

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# 1 2013 Student News

**Victoria Chraibi** received her M.S. degree in June 2012. Her thesis was titled: A 250-Year Assessment of Human Impacts on Lake Superior: An Updated Paleolimnological Perspective. Chraibi was advised by **Euan Reavie**.

**Elizabeth Kaufenberg** received her M.S. degree in June 2012. Her thesis was titled: Occurrence and Spatial and Temporal Variation of Pesticides and Antibiotics in Surface Waters. Kaufenberg was advised by **Pamela Rice** and **Paige Novak**.

**Jennifer Keville** received her M.S. degree in June 2012. Her thesis was titled: Effects of residential shoreline development on near shore aquatic habitat in Minnesota lakes. Keville was advised by **Bruce Vondracek**.

**Jane Mazack** received her M.S. degree in June 2012. Her thesis was titled: Emergence, survival, and longevity of adult *Diamesa mendotae* Muttkowski (Diptera: Chironomidae) in groundwater-fed streams. Mazack was advised by **Leonard Ferrington** and **Bruce Vondracek**.

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# Fall 2013 Resources and Publications

The Conservation Applications of LiDAR training program materials have been augmented with lecture videos and additional GIS exercises prepared by Andy Jenks of the UM Department of Forest Resources. All training materials for the program are freely available at [tsp.umn.edu](http://tsp.umn.edu) or through the state MnGeo website at [www.mngeo.state.mn.us/chouse/elevation/lidar.html](http://www.mngeo.state.mn.us/chouse/elevation/lidar.html)

***Wastewater indicator compounds in wastewater effluent, surface water, and bed sediment in the St. Croix National Scenic Riverway and implications for water resources and aquatic biota, Minnesota and Wisconsin, 2007-08***  
**2012. Tomasek, Abigail A., K. E. Lee and D. Hansen.**

The U.S. Geological Survey and the National Park Service cooperated on a study to determine the occurrence of wastewater indicator compounds including nutrients; organic wastewater compounds (OWCs), such as compounds used in plastic components, surfactant metabolites, antimicrobials, fragrances, and fire retardants; and pharmaceuticals in the St. Croix National Scenic Riverway in Minnesota and Wisconsin. <http://pubs.er.usgs.gov/publication/sir20115208>

***Sustainability of Minnesota’s water resources***  
**Swackhamer, D.L. 2013.** William Mitchell Law Review, in press

***Finding a path to sustainable water management: where we’ve been, where we need to go***  
**Enzler, S.A., S. S. Rhees, and D.L. Swackhamer. 2013.** William Mitchell Law Review, in press.

Book Review. ***DDT and the American Century*** by David Kinkela  
**Swackhamer, D.L.** Chemical and Engineering News, March 4, 2013, pp 54-55.

***Fate and transport of halogenated PBTs: We’ve come a long way, baby***  
**Swackhamer, D.L. 2013.** Environmental Toxicology and Chemistry, in press

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1 2013 Upcoming Events

October 15 and 16, 2013

## Water Resources Conference

St. Paul RiverCentre

St. Paul, MN

[Register here>>](#)

November 7, 2013

## Preparing Minnesota for Climate Change: A Conference on Climate Adaptation

Science Museum of Minnesota

St. Paul, MN

Plan now to join us at the first Conference on Climate Adaptation, designed for Local Officials, Planners, Engineers and Natural Resource practitioners to learn about other communities' early successes in developing adaptation strategies in areas such as transportation infrastructure, natural resources, human health, and agriculture. More information and registration [here>>](#)

March 28-30, 2014

## 2014 Midwest-Great Lakes SER Chapter Meeting

[Building on the Midwest Legacy of Restoration: Linking Theory and Practice](#)

For more details visit: <http://chapter.ser.org>

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